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ABSTRACT

The assumption that therapeutic or homework directives enhance therapy has received little research attention. To explore compliance with homework directives in a behavioral self-control treatment of weight loss, the comparative importance of social support (S), support plus directives with no rationale (SD), support plus directives with rationale (SDR), and support plus directives with rationale and involving a written contract (SDRC) was investigated using student volunteers (N=42) and a waiting list control group (N=5). Analyses of variance of the weight loss of all groups showed that participants in all conditions except the SD lost more weight than controls. Analyses of compliance with directives to call in, monitor calories and exercise, reduce calories, and increase exercise for the self control groups showed weight loss was correlated with call-in frequency and calorie reduction. Compliance was improved by providing rationales for directions but not by written contracts. A second study involving insurance company employees (N=22) investigated the potential causes of the failure of contracts to improve compliance by testing the hypothesis that systematic attention to compliance or noncompliance with behavioral homework would increase compliance. Attention to homework was found to effectively increase client compliance with directives. These experiments suggest that the relationship between compliance with directives and positive therapeutic outcome is not simple and deserves increased attention from researchers. (MCF)

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Compliance with Homework Tasks in a Behavioral Self-Control Weight Loss Program

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Abstract

Two investigations of compliance inducing strategies were performed. In the first, using overweight student volunteers, an evaluation was made of the components of a behavioral self-control treatment regime. Dependent variables were weight loss and compliance with directives to call in data, self-monitor calories and exercises, decrease caloric intake, increase exercise, and perform a number of behavioral tasks involving stimulus control over eating. Control groups involved a waiting list and a group that provided social support for individual change attempts. Self-control groups received support with directives, support with directives and rationales, and support, directives, rationales, and explicit written contracts. For all self-control groups, weight loss was correlated with call-in frequency and with reduction of calories. When self-control groups were compared on compliance with each directive, it was found that compliance was improved by providing rationales for directives. Adding written contracts did not increase compliance. The second experiment, using volunteers employed by an insurance company, investigated a potential cause of the failure of the contract to enhance compliance beyond directives plus rationales. Attention and no attention to clients' homework completion were compared. Attention to homework was effective at increasing client compliance with directives.

Compliance with Homework Tasks in

a Behavioral Self-Control Weight Loss Program

Behavior therapy in noninstitutional settings is based on the idea that therapy should not be confined to one hour per week. Rather, behavior therapists prolong their influence through assigning therapeutic directives. Although these directives are philosophically important to behavior therapy, there has been little research that examines whether directives are necessary for or hasten client change (Martin & Worthington, 1982; Shelton & Levy, 1981). Even assuming that homework directives enhance therapy, little research has examined whether clients actually carry out their assignments and what conditions increase the likelihood that clients will comply with behavioral homework. Shelton and Levy (1981) list eleven principles that apply to using behavioral homework. They adduce empirical evidence for the validity of each principle. Most of this support involves the indirect application of social psychological laboratory findings to therapy. Actual research in therapy or therapy-like situations is extremely sparse.

Martin and Worthington (1982) have summarized research and theory on behavioral homework within a three-stage model. They propose that therapists first devise the homework assignment, then present it, and finally monitor client performance on the task. There are two main issues in devising the assignment. First, the therapist must consider the nature of the task (e.g., complexity, degree of tailoring to the individual client, and specificity). Second, the therapist must consider the amount and nature of the client involvement, ranging from therapist-devised homework through client-advised homework. Presenting the homework assignment to the client involves describing the task, presenting a supporting rationale, enhancing commitment to the task, and anticipating noncompliance. Kanfer (1980) identified a number of variables that potentially affect client commitment to perform an assigned task. Salient among them is having the client make an explicit contract (public promise) that he or she will carry out the assignment. Rationales for homework assignments presumably are

important in engendering client compliance with homework directives, although no research has addressed this contention. After a homework assignment has been attempted by the client, the behavior therapists must decide how to treat the client's self-report about his or her performance of the task. One option is to ignore the assignment. Theoretically, this is not desirable; however, sadly to say, this option is frequently elected by (a) beginning therapists, (b) forgetful (e.g., burdened and overworked) therapists, and (c) therapists faced by client "crises" that must be attended to immediately. A second option involves what to do with the "successful" client's homework; how much attention is given the task, how much reinforcement, how much attention to the cognitions about the tasks? A third option involves how to handle the noncompliant or partially compliant client. In general, the way that therapists treat noncompliance usually dependes on their theoretical position. Good summaries of different positions may be found in Wilson and Evans (1977), who advocate a logical analysis of the possible causes for noncompliance, Mahoney (1974), who recommends manipulating perceived choice and the conspicuousness of therapist control, Cameron (1978), who recommends analyzing the client's cognitions about the homework, and Shelton and Levy (1981) who recommend involving family members, friends, or work associates (with the client's informed consent) to monitor homework compliance and, as a lost resort, using paradoxical directives.

The present research uses two experiments to explore therapeutic compliance with homework directives within a behavioral self-control treatment of weight loss. Two treatment populations are used -- the first, self-referred clients within a college environment and the second, self-referred clients within a large insurance firm. The first experiment investigates the comparative importance of social support, support plus behavioral directives (with no rationale), support plus directives accompanied by a rationale, and support plus directives accompanied by a rationale and involving a written contract. The second experiment investigates treatment of clients once they have been assigned to perform homework directives. Each participant received social

support, directives, rationales, and self-made contracts. In one group the therapist attended to homework performance during the previous week, while in the other group the therapist paid minimal attention to the homework performance during the previous week.

EXPERIMENT 1

Introduction

One factor in enhancing self-control has been the involvement of individuals in a support group composed of others experiencing a similar self-control problem. This method has effectively induced reduced smoking (Lawton, 1967) and hypertension (Caplan, Robinson, French, Caldwell, & Skinn, cited in Hogue, 1979). A second method of enhancing self-control has been to assign certain behavioral tasks such as to self-monitor calories and exercise, to systematically reduce calories and increase exercise, and to employ stimulus control procedures (Stuart, 1971). A third method of enhancing self-control has been to supplement directives with clear, specific rationales for their use. This method has been effective in increasing compliance with a self-administered medication regime (Colcher & Bass, 1972), and with other medical interventions (Latiolais & Berry, 1969; Parkin, Henney, Quirk, & Crooks, 1976). A final method has been to have individuals write explicit contracts stating their intentions to carry out the prescribed behavior. This method has proven effective with weight control (Dinoff, Rickard, & Colwich, 1972; Harris & Bruner, 1971; Mann, 1972,and with management of cold pressor pain (Kanfer, Cox, Greiner, & Karoly, 1974).

The present experiment compared these strategies (support; support plus directives; support, directives, and rationales; support, directives, rationales, and contracts) for inducing people to lose weight and to comply with directives in a behavioral weight control program.

Method

Participants

Volunteers (N=42) were drawn from the general psychology classes of a large urban university and received extra class credit for their participation. Only volunteers who were at least 7% overweight according to the Metropolitan Life Insurance Company (1959) weight standards -- validity problems not withstanding (Campbell, Bender, Bennett, & Donnelly, 1981) -- participated in the study. Mean initial weight for each experimental group may be found in Table 1. Participants were screened to insure the absence of medical problems that could potentially complicate their treatment before they were allowed to participate. Treatment groups (two per condition) were scheduled at several times and participants were assigned to a group on the basis of their availability at that time. Experimental treatments were then randomly assigned to groups.

Description of Treatments[1]

Waiting list control (WLC; n=5). WLC participants received no therapeutic contact. They were weighed during the first and last weeks of the experiment. At the second weighing, they began the experimental treatment that had proven most effective for the other groups, but those data were not included in this study.

Support (S; n=7). These volunteers participated in a structured group experience in which they were instructed that their meetings were to provide mutual support for their individual efforts to lose weight. Of necessity, participants discussed many attempts to lose weight, some behavioral in nature; however, no systematic behavioral self-control program was presented and directives were not assigned.

Support and directive (SD; n=12). Each week the therapist directed the group in a discussion of their past and present efforts to lose weight. As in the S condition, emphasis was placed on encouraging group support of individual efforts at weight loss. However, at the end of each session, participants received instructions on how to perform behavioral self-control tasks and were directed to perform them during the following week.

Support, directive, and rationale for the directive (SDR; n=8). Group support was solicited for individual efforts to lose weight, then the therapist presented a thorough behavioral self-control rationale for each task. The clients were directed to perform these tasks during the following week.

Support, directive, rationale for directive, and contracting (SDRC; n=10). As in all treatment groups, group support for weight control efforts was solicited. The therapist then presented the same rationale for the tasks as that presented in the SDR condition. Participants contracted to perform these tasks by completing a written contract sheet that they gave to the therapist at the end of the session.

Dependent Variables

Participants in the WLC condition were weighed with a standard physician's scale at the beginning and the end of the experiment. Participants in the other conditions were weighed at the beginning of each session, and their attendance at each session was recorded. Implicit in treatment was a directive to lose weight. It was assumed that the degree of compliance with assigned tasks would be reflected in the performance measure of weight loss; however, because weight loss can occur for reasons other than compliance with behavioral directives, weight loss was also treated separately from compliance with other directives (Dunbar, 1979).

Three types of measures were taken to assess compliance. Each night three and one-half hours were designated as call-in-times, during which participants in the three self-control groups (SD, SDR, SDRC) phoned in data for the preceeding 24 hours. Data were recorded on an automatic telephone answering system and participants had no nightly personal contact with the therapist. Frequency of prescribed call-in was a behavioral measure of compliance. The self-reported phoned-in data, e.g., number of calories consumed and duration of exercise, provided the second type of compliance measure. If participants failed to call in, they called in the following night and reported data for both nights. As a third type of measure, participants also completed a weekly questionnaire about their weight loss attempts.

Participants were given a number of homework directives: call-in nightly (4 weeks), self-monitor calories and exercise (4 weeks), reduce calories by 15% (second week) and maintain that reduced level (third and fourth weeks), increase physical exercise by 20 minutes (second week) and maintain that level (third and fourth weeks), take at least 20 minutes to eat each meal (second week), eat each meal at the same time each day (second week), locate two response chains leading to overeating (third week), break one response chain (third week), identify two specific alternative behaviors to snacking (third week). Call-in and monitoring were assigned for 27 days; reduce calories and increase exercise 21 days; other tasks, for 7 days.

Procedure

The experiment lasted five weeks with meetings held for two hours weekly except for the fourth week, which involved only individual weigh-ins. Each week, participants in the SD, SDR, and SDRC conditions were instructed in, and directed to perform tasks to help them lose weight. Participants in the WLC and S conditions were not directed to perform tasks.

In session one, all participants were weighed. The therapist conducted a discussion of weight control appropriate for each group, and homework directives were assigned as appropriate. Each subsequent session began with a weighing of all participants (except those in the WLC condition group). While being weighed, participants in the SD, SDR, and SDRC conditions completed a questionnaire concerning their compliance with the tasks assigned for that particular week. During session 3, participants were directed (with no rationale or contract) to return during their regular meeting time the following week to be weighed. At that time they were directed to continue with attempts at calorie reduction and exercise increase. Session 5 involved the final weighing for each participant. Participants were then debriefed and dismissed.

Results

Weight Loss and Session Attendance

Means and standard deviations for all variables may be found in Table 1. An unequal-n (least squares) analysis of variance (ANOVA) was performed on the weight loss

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Insert Table 1 about here
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of all five treatment groups from session 1 to session 5 (4 weeks). Groups differed in amount of weight loss, $F(4, 37) = 3.10$, $p < .05$. To determine the locus of the effect, Duncan's multiple range test was performed. Participants in all conditions except the SD condition lost more weight than those in the WLC condition, $p < .05$. Furthermore, both SDRC and SDR participants lost more weight than SD participants. The SD and S participants did not differ from each other. Four of the groups attended experimental sessions and their rate of attendance did not differ.

The Relationship Between Task Compliance and Weight Loss

Each week the frequency of compliance with the assigned tasks was correlated with weight loss for th week. Correlation coefficients are reported in Table 1. Every week call-in was related to weight loss. Calorie monitoring and exercise monitoring were correlated with weight loss only during week 4, though exercise monitoring during the entire four-week program was related to weight loss during the entire program. Calorie decrease was correlated with weight loss every week it was assigned and over the entire program. Exercise increase was not correlated with weight loss during any week or during the entire program. Of the tasks assigned for one week, none were correlated with weight loss.

Homework Tasks

Compliance during Week 1. To analyze compliance with homework during the first week, a multivariate analysis of variance (MANOVA), using the first week of calls, calories monitoring, and exercise monitoring as dependent variables, was performed on the three self-control groups: SD, SDR, and SDRC. Hotelling-Lawley's trace was used to approximate the multivariate F ratio. Treatment groups differed from each other, multivariate $F(6, 56) = 2.35$, $p < .05$. To determine the locus of the effect, individual ANOVAs were performed on each dependent variable. Groups did not differ on any individual variable; thus, additional post hoc comparisons were not warranted.

Compliance during Week 2. To analyze compliance during the second week, a MANOVA was performed on the three self-control groups using, as dependent variables, compliance with directives to call in, monitor calories, monitor exercise, reduce calories, and increase exercise, and compliance with directives to increase duration of meal time to twenty minutes, and eat meals at the same time daily. Hotelling-Lawley's trace was used to approximate the multivariate F ratio. Groups differed from each other, multivariate $F(14, 30) = 2.39$, $p < .02$. To determine the locus of the effect, individual ANOVAs were performed on each dependent variable. Groups differed on compliance with directives to increase exercise, $F(2, 22) = 3.51$, $p < .05$, and to eat meals at the same time daily, $F(2,22) = 4.45$, $p < .02$. Groups did not differ on any other variable. Duncan's test showed that the participants who used contracts (SDRC) increased exercise more than participants not hearing rationales (SD); no other differences were found. For compliance with directives to eat at the same time daily, participants in groups hearing a rationale (SDR and SDRC) complied more than those who did not hear the rationale (SD).

Compliance during Week 3. To analyze compliance during the third week, a MANOVA was performed on the three self-control groups using, as dependent variables, compliance, during the third week, with directives to call in, monitor calories, monitor exercise, increase exercise, and decrease calories, and compliance with directives to locate two response chains, break one response chain, locate two tasks that interfere with eating, and eat all meals with specific plates and utensils. Hotelling-Lawley's trace was used to estimate the multivariate F ratio. Self-control groups differed from each other, multivariate $F(18, 28) = 3.77$, $p < .001$. To determine the locus of the effect, individual ANOVAs were performed on each dependent variable. There were no significant univariate effects; however, differences approached significance for exercise monitorings ($p < .10$) exercise increases, ($p < .06$), the behavioral task of identifying two interferring tasks ($p < .10$), and the behavioral task of eating with specific utensils ($p < .08$). These variables probably contributed most of the significant multivariate effect.

Compliance during Week 4. A MANOVA was performed on the three self-control groups using, as dependent variables, compliance during the fourth week with directives to call in, monitor calories, monitor exercise, reduce calories, and increase exercise. Hotelling-Lawley's trace was used to estimate the multivariate F ratio. Groups differed from each other, multivariate $F(10, 34) = 2.07$, $p < .05$. To determine the locus of the effect, univariate ANOVAs were performed on each dependent variable. Groups differed only on exercise increases, $F(2, 22) = 6.93$, $p < .005$. Duncan's test showed that, for exercise increase, participants in groups hearing a rationale (SDR and SDRC) increased exercise more than those in the group receiving no rationale (SD).

Compliance with the weight loss program. A final MANOVA was performed for the self-control groups on the following variables: weight loss, total calls, total days that calories and exercise were monitored, total daily increases in exercise and decreases in calories, and all of the behavioral tasks described above. Hotelling-Lawley's trace was used to estimate the multivariate F ratio. There was a significant multivariate effect, F (24, 16) = 3.55, $p < .01$. To determine the locus of this effect, univariate ANOVAs were performed on each variable. The analyses of the behavioral tasks, which were assigned for only one week, are reported above by the weeks in which they were measured. Different compliance rates were found only for eating meals regularly ($p < .05$). Throughout the experiment, conditions differed on weight loss, $F(2, 25) = 4.56$, $p < .05$, and increasing exercise, F (2, 22) = 5.35, $p < .01$. For all three variables on which differences were found, those who had heard the rationale (SDRC and SDR) complied more than those who did not (SD); SDRC did not differ from SDR on any variable.

Discussion

There are three main findings of the present experiment. First, support for participants' self-change efforts and behavioral self-control therapy were both more effective at producing weight loss in a brief therapy experience than was participating on a waiting list. Second, participants who complied more with calorie reductions and

daily call-ins lost more weight than those who did not comply. Third, within a behavioral self-control program for weight loss, providing rationales for each task produced higher compliance than issuing directives without providing detailed rationales.

This self-control program, though brief, resulted in weight loss relative to waiting list controls. Weight loss might occur for numerous reasons unrelated to the self-control program. It has thus been challenged as an uncontaminated measure of compliance (Campbell, et al., 1981). For example, participants in the social support condition received no behavioral training, yet lost more weight than participants on the waiting list. In fact, providing social support for individuals' weight change efforts was as effective as one of the behavioral self-control conditions at producing weight loss. Richards and his colleagues have shown that, under favorable conditions, people employ a wide variety of effective (and ineffective) naturally occurring self-control strategies (Doerfler & Richards, 1981; Perri & Richards, 1977). This is often true of weight control problems. Apparently, the social support condition provided sufficient stimulus control, through the presence of the therapist, weekly public weigh-ins, and attendance of other weight-changers, to activate those naturally-occurring strategies. For example, a variety of behavioral self-control strategies were spontaneously discussed during the conduct of the support group. Behavioral self-control techniques apparently have become part of the weight change repertoire for a large number of people. Both of the groups that received rationales for the behavioral self-control directives lost more weight than the group that received only directives. In general, participants in both the SDR and the SDRC conditions complied with more elements of the BSC regime than SD participants. This suggests that weight loss might be due to differential compliance with directives.

Correlation coefficients show a relationship between calling-in and weight loss. The act of calling-in and reporting data on an automatic phone-answering device might have exerted powerful stimulus control over behaviors associated with weight loss. Other correlations suggest that calorie reduction and weight loss were related. Exercise increase and weight loss were only mildly related (all p's except one week $< .10$).

People hearing rationales for directives complied more than people hearing directives not supported by rationales. They also lost more weight. There are several explanations for this finding. One suggestion is that not giving a rationale for directives produces active resistance. Cameron (1978) has suggested that resistance is best conceptualized as due to the negative self-verbalizations that a person engages in concerning themselves or concerning the inefficacy or inappropriateness of the therapy. Giving people directives without providing reasons why these directives should be expected to work might initiate such "resistant" self-verbalizations. Resistant self-verbalizations might also arise from interpersonal struggles for influence and control (Haley, 1963). When a person perceives being controlled by an external agent -- as might happen when a person receives "orders" (directives) without accompanying rationales -- the person usually engages in highly emotional mental dialogue, such as mentally rehearsing conversations with the controlling agent. This dialogue focuses the person's attention on resisting the external control.

Another possible reason for the superior compliance of participants who heard the rationale over those who did not is that the rationale engendered active compliance. Presumably compliance could be engendered by affecting the participants' self-verbalizations. The content of the compliance-engendering self-verbalizations might vary. For some people, positive cognitions about therapy could be promoted by providing a rationale. For example, Girodo and Wood (1979) using self-control of cold pressor pain, suggested that a rationale for their directives provided a context in which to understand the meaning of their directives. Within the present experiment, participants who heard no rationales for the weight control directives may not have understood the meaning of the directives for them. Certainly when people understand how their behavior is expected to contribute to reaching their ultimate goal, they are more willing to expend effort doing the task. For example, Langer, Blank, and Chanowitz (1978) showed that rationales are particularly useful when tasks require a great deal of effort. Besides providing contextual relevancy for assigned tasks, rationales might change cognitions through affecting people's"personal theory" of weight control. Leventhal (1981) has

suggested that people resist their doctor's orders because their behavior is controlled by their own, often erroneous, notions about health and disease. When no rationale is given for therapeutic directives, the person's (possibly mistaken) beliefs are not challenged, and resistance often ensures. To the contrary, providing a rationale for directives might substitute accurate reasons for complying for inaccurate reasons for resisting. One other reason that rationales might have induced increased compliance over directives alone is that rationales might have enhanced expectancy for change, thus encouraging participants to persist more ardently at self-control efforts.

Another finding was the failure of the contract to add to the power of the treatment. This is not consistent with other weight control studies (Harris & Bruner, 1971; Leon, 1976; Mann, 1972), nor is it consistent with analogue studies of contracting (Kanfer, Cox, Greiner, & Karoly, 1974). Kanfer et al. (1974) suggested that the experimenter's response to contract fulfillment was an important factor in subsequent client performance. When the experimenter paid attention to the fulfillment of the contract, subjects were more likely to comply on subsequent cold pressor trials. In the present experiment, little systematic attention was given to contract fulfillment. Subjects may thus have undervalued the significance of the contract, thereby decreasing its effect. Others have also suggested that the therapist's response to contract compliance will affect subsequent participant responses (Haley, 1976; Shelton, 1979; Wilson & Evans, 1977).

The second experiment tests the hypothesis that systematic attention to compliance or noncompliance with behavioral homework would result in increased compliance with subsequent homework. Using a treatment for weight control that involved directives, rationales, and formal contracts, and using a non-student sample, a comparison was made between a condition that received systematic attention to homework with one that did not.

EXPERIMENT 2

Method

Participants

Participants (N=22) employed at an insurance company regional office volunteered to participate in a weight control group that involved research. Employees included both clerical and managerial personnel. They were recruited through a one-page public announcement. At the intial session, participants were screened to insure the absence of medical problems and were weighed. Only those individuals who were at least 7% overweight as compared to the Metropolitan Life Insurance Company (1959) weight standards participated in the study. Treatment groups were scheduled at several times, and participants were assigned to a group on the basis of their availability at that time. Participants were assigned to one of two groups: attention to homework (A) and no attention to homework (NA).

Description of Treatments

Attention to homework (n=11). Each week participants were weighed. They then participated in a group exercise during which they formed dyads and discussed their performance of the previous week's directed tasks. They reformed into the larger group and discussed with the therapist their homework performance from the previous week. Special attention was given to the participants' behavioral response to the directed tasks. Reasons for noncompliance were elicited, as were alternate methods of performing the tasks. The experimenter emphasized the necessity of performing each directive and encouraged compliance. Participants then received instructions on the assigned tasks for the next week. This included behavioral rationales for the tasks and written contracts to perform the directed tasks.

No attention to homework (n=11). Each week participants were weighed. They then participated in a group exercise during which they formed dyads and "got to know one another better," thus controlling for time of therapeutic contract and maintaining simi-

lar structural characteristics of the two groups. Later, they received the same rationales, directives, and contracts as the other group. The participants did not systematically discuss their performance of the previous week's tasks, but the experimenter answered any questions that arose spontaenously regarding previously assigned tasks.

Procedure and Dependent Variables

Procedure was identical to that of experiment one[1] with the following exceptions: (a) The first twenty minutes of all sessions after the first were spent in group exercise involving manipulation of attention (or none) to homework compliance. This lengthened the total treatment by 1 hour. (b) Session four involved a one hour lecture concerning nutritional information in addition to the weekly weigh-in; whereas, in the first experiment, session four involved only individual weigh-ins. The addition of a fourth (non-behavioral) session did allow the therapist to remind participants to continue nightly reporting of assigned tasks, refresh their memories of rationales, and renew contracts.

During session one, participants were assigned to call-in and to monitor calories and exercise, which they did during week one. The first intervention relevant to this experiment, however, did not occur until session two, when attention (or none) was given to homework compliance. Thus, the dependent variables were measured only during weeks two, three, and four. They were change from baseline (week one) in mean number of days per week that each participant called-in, monitored calories, and monitored exercise, and change from baseline (week two) in mean number of days per week that each participant reduced calories at least to the contracted level and increased exercise to the contracted level. Because stimulus control tasks were not reassigned, they were not appropriate dependent variables.

Results

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Weight Loss and Session Attendance

Mean and standard deviations for all variables are given in Table 2. An ANOVA

on the weight loss by the two treatment groups revealed no differential weight loss, $F(1, 20) < 1$. An ANOVA was performed on the frequency of return to therapy sessions. Participants in the attention condition returning more consistently than those in the no attention condition, $F(1, 21) = 6.26$, $p < .05$.

Insert Table 2 about here

Compliance with Homework Directives

During the first week, participants called in data, monitored calories, and monitored exercise to establish baseline measures. A MANOVA was performed, which used number of calls, number of days calories were monitored, and number of days exercise was monitored for each participant as the dependent variables. Hotelling-Lawley's trace was used to approximate the multivariate F ratio for all MANOVA. Groups did not differ on compliance, $F(3, 18) < 1$.

During the second week, after attention (or none) to first week homework, dependent variables were change from baseline call-in frequency, calorie monitoring frequency, and exercise monitoring frequency. A MANOVA revealed no difference between the groups, multivariate F $(3, 18) = 1.46$, $p > .10$.

Duirng the third week after attention (or none) to second week homework, dependent variables were change from baseline call-in frequency, calorie monitoring frequency, and exercise monitoring frequency, and change from the previous week's frequency of days decreasing calories and increasing exercise. A MANOVA revealed a significant multivariate effect, $F(5, 12) = 6.89$, $p < .01$. ANOVAs on each variable showed that attention to homework resulted in higher compliance with directives to call in data, $F(1, 10) = 4.51$, $p < .05$, and to reduce calories, $F(1, 16) = 14.8$, $p < .001$.

During the fourth week, dependent variables were change from baseline in call-in frequency, calorie monitoring frequency, and exercise monitoring frequency, and change from the week two level in days decreasing calories and increasing exercise. A MANOVA revealed no difference between groups, $F(5, 9) = 2.61$, $p < .10$. Because the multivariate analysis approached significance and because the present research is exploratory univari-

ate ANOVAs were performed even though they were not strictly warranted. Higher compliance was found for participants who attended to previous homework for directives to call in data, $F(1, 13) = 8.54$, $p < .01$, to reduce calories, $F(1, 13) = 7.13$, $p < .02$, and to increase exercise, $F(1, 13) = 7.13$, $p < .02$, and to increase exercise, $F(1, 13) = 4.63$, $p < .05$.

Discussion

Attention to homework was effective in increasing client adherence to weight loss directives. The effect was not noted after only one week, but with repeated attention, differences became more pronounced. This suggests that therapists need to vigilantly pursue assigned homework until clients consistently comply, for by complying clients can experience the gains for which they can be rewarded in their natural environments. An alternative explanation for the increased compliance following the discussion of homework is that discussions allowed participating members to compare themselves with others, e.g., to an external standard. In their discussion of contract fulfillment, Kanfer et al. (1977) noted that social comparison was necessary for the conditions of the contract to become internalized. Internalization of therapist-directed behavior is important so that self-control is enhanced rather than therapist-control.

General Discussion

These two experiments suggest that compliance with directed homework enhances therapeutic change in a behavioral self-control weight loss program. Furthermore, compliance may be enhanced through supplementing directives with thorough rationales and written contracts, provided systematic attention is paid to homework compliance.

These two studies are suggestive rather than definitive due to a number of methodological shortcomings, such as small n's, use of college student volunteers (in Experiment 1), use of only one therapist who was aware of the experimental hypotheses,

short duration of treatment (only four weeks), and lack of a follow-up. The short treatment duration is particularly troublesome, for other researchers have noted that initial enthusiasm is often sufficient to induce participation in weight loss regimes, but that serious problems with compliance usually develop about the fifth or sixth week (Campbell et al., 1981). Another problem is the choice of dependent variables used in this research. There were no unobtrusive measures of compliance. All dependent variables except weight and call-ins were self-report measures. Furthermore, call-in frequency, though easily and objectively tabulated, was under direct surveillance by the researchers and thus might be subject to different influences from measures that are not easily observable.

One difficulty in interpreting the results of the first experiment is that correlational data for treated individuals suggest that weight loss is best predicted from knowing who complies with instructions to call in and who is able to reduce caloric intake. Analyses of variance on group data, however, suggested that groups differentially complied primarily with directives to increase exercise and not with directives to decrease calories. This suggests that weight loss might not have been as strongly influenced by rationales and contracts as were individual compliance measures. In addition, not all compliance measures were uniformly affected by the independent variables.

Shortcomings notwithstanding, these experiments investigated compliance per se rather than assumed that weight loss was produced by complying with components of the behavioral self-control treatment program. The weight loss achieved by fully treated participants in this research is comparable to that achieved by participants in most other behavioral programs (Campbell et al., 1981). Furthermore, dropout rate is important in most weight control research. In the present research, there were few missed sessions. Of four sessions, the mean number of sessions attended by all students and insurance employees who received behavioral treatment (n=52) was 3.6.

Although compliance research has been popular recently in medical settings (see Sackett, Taylor, & Haynes, 1979 for a review), few experiments have addressed compliance

directly in a behavior therapy context. This experiment suggests that the relationship between compliance with homework directives and positive therapeutic outcome is not simple and deserves increased attention from behavioral researchers.

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Footnotes

Requests for reprints may be sent to the first author at Psychology Department, 800 W. Franklin St., Richmond, Virginia 23284. The first experiment was the master's thesis of the second author and was supervised by the first author. The authors wish to thank Aetna Insurance Company for allowing its employees to participate in this research. Portions of this research were presented at the meeting of the Eastern Psychological Association (1982) and at the meeting of the American Psychological Association (1982).

[1]Detailed treatment manuals for each condition are available from the first author upon request.

Table 1

Means and Standard Deviations for Weight and Compliance Frequency for Self-Control Conditions Each Week During Experiment 1.

Variables	Self-control Condition[a] SDRC M	SDRC SD	SDR M	SDR SD	SD M	SD SD	Correlation With Weight Loss[e]
Initial Weight[b]	159.0	28.0	160.4	28.0	147.3	17.7	
Week 1							
Call-in[c]	4.7	1.8	4.7	2.5	3.3	1.9	.44*
Monitor calories[c]	5.9	1.9	5.6	1.6	5.3	1.8	.23
Monitor exercise[c]	3.7	2.3	5.3	1.8	2.4	2.3	.30
Week 2							
Call-in[c]	3.8	1.1	3.7	2.7	2.3	1.4	.46*
Monitor calories[c]	5.3	1.9	4.0	2.8	5.3	2.7	.19
Monitor exercise[c]	4.7	1.6	3.8	2.6	2.9	2.7	.22
Decrease calories[c]	3.9	2.1	4.1	2.0	3.6	2.1	.54*
Increase exercise[c]	6.3	1.1	4.8	2.5	3.1	2.3	.35+
Increase meal duration[d]	.6	.3	.4	.4	.4	.4	.08
Eat at same time[d]	.8	.2	.8	.2	.5	.3	-.06
Week 3							
Call-in[c]	3.2	1.8	4.1	1.9	2.6	1.7	.48
Monitor calories[c]	5.5	2.3	4.9	2.6	5.3	2.6	.31+
Monitor exercise[c]	5.1	2.5	4.8	2.8	3.2	2.9	.34+
Decrease calories[c]	4.8	1.6	4.8	1.7	3.9	1.9	.39+
Increase exercuse[c]	5.9	.8	4.8	2.4	3.3	2.9	.30
Locate two chains[d]	.7	.5	.8	.5	.8	.4	.00
Break one chain[d]	.7	.5	.7	.5	.6	.5	.21
Locate interfering task[d]	1.0	0	1.0	.0	.8	.5	.08
Eat in specified place[d]	.7	.3	.5	.4	.7	.3	-.04
Week 4							
Call-in[b]	2.4	1.4	2.6	2.5	1.1	1.4	.58*
Monitor calories[b]	4.0	2.1	3.1	2.5	2.9	2.8	.40*
Monitor exercise[b]	3.6	2.1	3.1	2.5	2.3	2.5	.45*
Decrease calories[b]	3.3	1.5	2.9	2.3	2.7	1.8	.54*
Increase exercise[b]	5.8	.8	5.0	2.1	2.3	2.4	.33+
Total Program							
Call-in	14.1	5.7	15.1	9.3	9.3	5.2	.54*
Monitor calories	20.7	7.0	17.6	9.6	18.8	9.0	.33+
Monitor exercise	17.1	5.9	17.0	9.4	10.8	9.3	.38*
Decrease calories	12.0	4.9	11.8	5.7	10.4	4.5	.55*
Increase exercise	18.0	2.7	14.6	6.6	8.4	7.5	.35+
Attendance	3.7	.7	4.0	.0	3.8	.4	
Final Weight[a]	154.4	21.5	156.6	30.2	146.3	19.4	
Weight Loss[a]	4.6	3.2	3.8	5.7	1.0	2.9	

Table 1 (Continued)

Note. Abbreviations: SDRC=Support, Directives, Rationales, and Contracts; SDR=Support, Directives, and Rationales; SD=Support and Directives.

[a]The support only condition had a mean initial weight of 147.4 lbs (SD=7.6), a final weight of 143.5 lbs (SD=7.7), weight loss of 3.9 lbs (SD=2.4), and attendance at sessions of 3.9 (SD=4). The waiting list control group had mean initial weight of 156.2 lbs (SD=20.5), final weight of 157.2 lbs (SD=21.7), and weight gain of 1.0 lbs (SD=2.5).

[b]Weights and weight losses are expressed in pounds.

[c]Call-in, monitor calories and exercise, decrease calories, and increase exercise are expressed in mean number of days per week that participants performed directives.

[d]Behavioral tasks are expressed as the fraction of those who reported successfully completing each task.

[e]Correlations are Pearson Product Moment Correlations, df=28.

*p .05

+p .10

Table 2

Means and Standard Deviations on the Performance of Tasks Following Experimental Interventions (Experiment 2)

	Group				
	Attention		No Attention		
	$\bar{M}$	SD	$\bar{M}$	SD	F
Week Two[a]					
Call-In	.55	1.57	-.83	1.70	2.60
Calorie Monitorings	.27	2.70	-1.72	3.13	.78
Exercise Monitorings	1.36	3.00	-.50	2.35	1.40
Week Three[b]					
Call-In	-.19	1.67	-1.90	1.85	4.28+
Calorie Monitorings	-1.19	3.54	-2.90	2.68	.42
Exercise Monitorings	-.45	3.10	-1.60	2.54	.24
Calorie Reductions	1.60	1.43	-.75	1.17	14.08*
Exercise Increases	.70	2.00	.00	1.50	.67
Week Four[c]					
Call-In	-1.18	1.88	-3.00	1.76	5.17*
Calorie Monitorings	-3.27	2.90	-4.80	1.93	1.97
Exercise Monitorings	-1.81	2.63	-3.10	2.13	1.48
Calorie Reductions	.75	1.39	-2.00	2.51	7.13*
Exercise Increases	.50	1.77	-1.28	1.38	4.63*
Weight Loss[d]	6.18	4.05	5.25	4.19	.02
Return to Session[e]	3.72	.46	3.00	.85	4.54*

Note. During week one, participants called in, reported their daily calorie counts and how much they exercised each day. These data are not reported because the first intervention of attention (or none) to homework directives did not occur until session two (prior to week two). Dependent variables of interest are thus changed in frequency for each variable monitoring frequency, and exercise monitoring frequency were taken during week one. Baselines for calorie reductions and exercise increases were taken during week two.

[a]For each task, the change in frequency of performance was calculated by subtracting the frequency during the baseline week (prior to attention or none) from the frequency during week two.

[b]For each task, the change in frequency of performance was calculated by subtracting the frequency during the baseline week from the frequency during week three.

[c]For each task, the change in frequency of performance was calculated by subtracting the frequency during the baseline week from the frequency during week four.

[d]Means reflect the weight lost by participants.

[e]Means reflect the number of sessions that participants attended. The maximum number equals four.

*$p < .05$

+$p < .10$